

A.J.S.

WINNER OF FIVE TOURIST TROPHY RACES

JUNIOR RACE, 1914, 1920, 1921, 1922, AND SENIOR RACE, 1921.

In the 1923 JUNIOR T.T. a 2½ h.p. A.J.S. made the **FASTEST LAP** ever put up, the rider, Mr. J. H. Simpson, covering the 37½ miles of the course from a standing start, in 38 minutes, at the remarkable Average Speed of 59.59 miles per hour.

Other 1923 Successes include

FIRST in the French Grand Prix.

FIRST in the Italian Grand Prix of Nations.

Winner of the Scottish Speed Championship.

FIRST in the Irish Temple "50" Race.

MANUFACTURED THROUGHOUT BY

A. J. STEVENS & CO. (1914) Ltd.,

WOLVERHAMPTON.

TELEGRAMS: "HOPIT, WOLVERHAMPTON."
TELEPHONE: 1155 (THREE LINES).

A.J.S. Motor Cycles



◦ 1924 ◦

2½ h.p. 3-SPEED A.J.S. SOLO MACHINE.
MODEL B (side by side Valves).

APPLICABLE TO MODELS B1 AND B5.

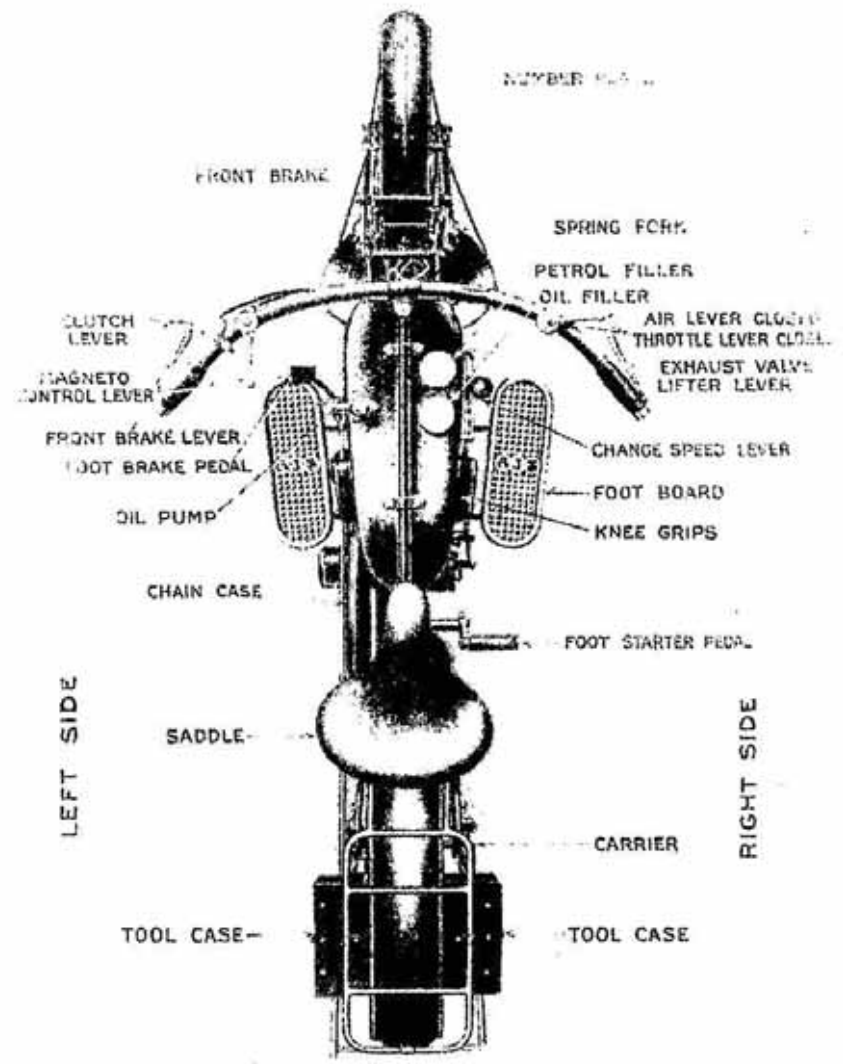
Also to Models B, B1 and B5 1922-23, and
Model B2 1921-22.

HOW TO MANAGE THEM.

A. J. STEVENS & CO. (1914) Ltd.,
GRAISELLEY HOUSE WOLVERHAMPTON.

PLAN **A.J.S.** VIEW.

A.J.S. 2 1/2 H.P.



MOTOR CYCLES.

Contents.

FOREWORD.

It has always been our earnest endeavour to construct our Motor Cycles on such simple and straightforward lines that the motor cyclist with little or no previous experience can manage and look after them.

Complications in the way of design have never been allowed to find a place in our products. This little booklet is intended as a guide on how to get the best out of the 2³/₄ h.p. A.J.S. by becoming acquainted with its salient features.

We have very carefully compiled the information in the following pages and trust it will be of assistance to the rider in keeping his machine in the best possible condition and elucidating any little troubles which may from time to time take place.

We particularly commend that portion of the booklet devoted to *Driving Instructions* and *General Care of the Machine* and to take particular note of those instructions which are emphasised by being printed in italics.

Re Supply of this Publication.

A copy of this booklet is supplied free with every new 2³/₄ h.p. A.J.S. Motor Cycle. Applications for extra copies must be accompanied in every case by a remittance for 6d. to cover cost and postage.

A. J. STEVENS & CO. (1914) Ltd.

	PAGE
Driving Instructions	7
Engine Lubrication	10
Engine Adjustments and Cleaning	10
Magneto Adjustment	11
Engine Timing	12
Gear Box	13
Gear Box Dismantling	14
Clutch Adjustment	14
Transmission	16
Adjustment of Chains	16
Care of Chains	16
Chain Repairs	17
Chain Case	18
Magneto	19
Platinum Point Adjustment	19
Magneto Timing	19
Ignition Trouble	20
Carburetter	21
Slow Running	21
Setting and Driving	21
Easy Starting	22
Adjustment of Slides	22
Flooding	22
Petrol Consumption	22
Detachable Wheels	23
Removal of Back Wheel	23
Tyre Repair	23
Removal of Front Wheel	24
Adjustment of Hub Bearings	24
Foot Starter	25
Steering Head	26
General Instructions	27

Driving Instructions, etc.

For 2½ h.p. Three-speed A.J.S. Motor Cycle.

Index to Illustrations.

	PAGE
Plan View	3
Change Speed Gear Lever	8
A.J.S. 2½ h.p. Engine	10
Magneto Adjustment	11
Arrangement of Timing Gear	12
Gear Box in Position	13
Gear Box in Section	13
Clutch Parts	14
Chain Guard with Clutch Cover removed ...	15
Chain Stud Extractor	17
Chain Repair Parts	18
Magneto	19
Magneto Timing	20
Carburettor	21
Back Detachable Wheel removed ...	23
Front Wheel	24
Internal Expanding Brake	24
Replacing Footstarter Spring	25
Adjusting Steering Head	26

AFTER receiving the machine, thoroughly examine it and get conversant with its details. Fill up with petrol and oil.

Only oil suitable for air cooled engines must be used.

Turn on the petrol tap by turning the tap lever downwards in line with the petrol pipe, and "flood" the carburettor by pressing the knob on top of float chamber. Turn on the oil tap, found below the elbow outside tank, by turning the lever in a line with the pipe (this tap can be left in the "on" position while riding, and need only be turned off when the machine is left standing for a long period). For further particulars of lubrication see "Engine Lubrication" on Page 10.

Inject a small quantity of petrol into the cylinder through the compression tap by means of priming pipe under the tank. It will greatly facilitate the entry of the petrol into the cylinder if the exhaust valve lifter is raised. After the petrol has been injected see that the compression tap is closed again.

Unless the engine is difficult to turn when cold with the kick-starter, it is seldom necessary to inject petrol into cylinder.

Now mount the machine and carry out the following operations:—

1. See that the gear lever is in the "Neutral" position marked on gate change quadrant (Illustration B).
2. Nearly close the air lever (the shorter one) of carburettor control and open throttle lever (the longer one) about one-third. The levers open to the left (inwards) and close to the right (outwards). The carburettor is the "A.M.A.C." For full details and hints on adjustments, etc., see pages 21 and 22.
3. Lift the exhaust valve by means of the lever under the right handle bar grip.
4. Engage the kick-starter with the right foot (using the instep of the boot) and press smartly backwards and downwards, at almost the same time release the valve lifter and the engine should then start. Take the foot off the kick-starter pedal immediately the engine fires, but do not allow the kick-starter to spring back with a "bang" after starting the engine. Bring the foot back with the pedal, and so prevent a heavy blow being given to the stop. After once mastering these details the engine can be started with the back wheel on the ground.

Presuming these instructions have been carried out take out the clutch by means of the clutch lever on the left hand side of handle bar—place the gear lever in the low position, speed up the engine by opening the throttle a little, and gently release the clutch lever. The machine will then move forward on the low gear. When the machine has attained a fair speed on this gear, again pull out the clutch and move the gear lever into second gear position, immediately re-engaging the clutch.

Repeat this operation to engage high gear. When running on high gear the machine must be controlled by means of the throttle lever and brakes. To stop, close the throttle, and when the machine is almost at a standstill, take out the clutch and apply the footbrake.

The change speed lever is operated as follows:—To engage the low gear from neutral, press the lever lightly to the right and pull backwards (see "Important Warning" below). To move to second gear, again press lightly to right and move the lever forward into second gear position. To engage high gear from second, press the lever to the left and move it forward into the high position. How to operate the gear lever will be obvious if a careful examination is made of its construction. The gear lever has a positive stop for each gear, whether changing up or down, and is automatically locked in each position when released by the hand.

Important Warning.

If the change speed lever does not move quite easily into position, do not attempt to force it. Move the machine slightly backwards or forwards, or turn the back wheel, while keeping a little pressure on the lever. This will bring the "dog clutches" in the gear box into proper position for engagement, and the gears will engage without using unnecessary force. Under no circumstances must this lever be forced into position, or the working parts will be strained and damaged.

This warning only applies when the machine is stationary, not when being ridden.

Always drive with the air lever of carburetter open as far as possible consistent with the engine firing properly. It is not always necessary to stop the engine when the machine is brought to a stand-still, but it can be left quietly running until ready to start away again. This can be done by taking out the clutch momentarily, and slipping the gear lever into the neutral position, afterwards releasing the clutch again. The engine will now be running free. Do not "race" the engine while standing, throttle it down just sufficient to keep it firing until ready to start away again. In the case of a short stop, as when obstructed by traffic, the clutch only need be taken out, but always remember to engage low gear when starting again.

Although it is not absolutely necessary to do so, it will be found a much nicer method of changing gear if the following instructions are carried out:—When changing from a low to a higher gear, slightly slow the engine down by closing the throttle a little immediately before changing. When changing down let the engine accelerate slightly with the clutch out before engaging the lower gear. A bit of practice will soon make the rider proficient. Never change from a high gear to a lower gear when travelling fast. Always slow down to the speed the machine would be travelling if the low gear was engaged, or, in other words, never change from high gear to second when travelling at over twenty miles per hour, or from second gear to low gear when travelling above twelve miles per hour. Never change to a lower gear for braking purposes; excepting on an exceedingly steep hill, otherwise the brakes are powerful enough.



THE A.J.S. PATENT CHANGE SPEED
LEVER.

Illustration B.

Always change gear quickly and firmly, but without using unnecessary force.

When climbing a steep hill which necessitates changing down to a lower gear, always change while the machine has reasonable "way" on it. Do not let the machine come almost to a stand-still before changing.

If the machine will not climb a hill on top gear, do not force it to do so by slipping the clutch and change to a lower gear. If the clutch is allowed to slip for a lengthy period under such a heavy driving load it will—owing to the intense heat generated by friction burn out the cork inserts, in fact would destroy, by heat, any material of which a clutch may be composed. There is really no cause for the rider who destroys his clutch by this practice. It is not only bad driving, but it is trying to make the clutch do the work of the gear box which is utterly impossible.

Do not run the machine unnecessarily on low gear. This gear is only provided for ease of starting, and climbing exceptionally steep hills, or when negotiating thick traffic demanding a very slow rate of progress. Using the low gear unnecessarily simply means extra wear and tear, high petrol consumption, and shortens the life of the engine, and transmission.

When climbing an exceptionally steep hill it is sometimes an advantage to slightly retard the spark, but under normal conditions the spark lever should be kept in the "advanced" position. If the engine has any tendency to "kick back" when starting it with the foot starter, slightly retard the ignition. The lever on the left handle bar is moved inwards to advance and outwards to retard.

When running at very low speeds on top gear a slight harshness in the drive may be felt, which is common to all petrol driven machines, however well balanced an engine may be. More especially is this so in the case of a single cylinder engine. To counteract this we fit a shock absorber on the engine shaft, which damps out as far as possible any snatch at low speeds. The driver has also a further means of eliminating this slight harshness by judicious use of the ordinary clutch. By raising the hand clutch a little, by means of the lever on the handlebar, the driver can be made just as sweet and as comfortable as one may wish. A slight pressure of the hand on this lever allows the clutch to slip slightly under the impulses of the engine, and so the clutch is instantly converted into a perfect shock absorber at the will of the rider. The foregoing hints also refer to "picking up" again after slowing down for a corner, or any other occasion when the machine is to be accelerated suddenly from a slow to a higher speed. It must be quite understood, however, that the clutch is not disengaged so much that it slips to the extent that the engine can "race." Only just so much pressure should be exerted on the lever to allow the clutch to absorb the impulses of the engine. We earnestly commend this paragraph to those riders who are anxious to get the best results and long life from the engine gears, and chains, to say nothing of the added comfort and satisfaction.

Do not control the speed of the machine with the free engine clutch, excepting in very congested traffic as previously mentioned. Always drive "on the throttle." The object of the clutch is **not** to control the speed, the throttle in conjunction with the gear box and the brakes should be used for this purpose.

After a short run it will be found that the control of the machine is quite simple, and the disposition of the levers, operating the footbrake and the clutch, give the rider absolute mastery over his mount. On low gear the machine can be driven at a perfect crawl, and on high gear it is capable of attaining a speed to satisfy even the fastest of riders.

Care of the Machine.

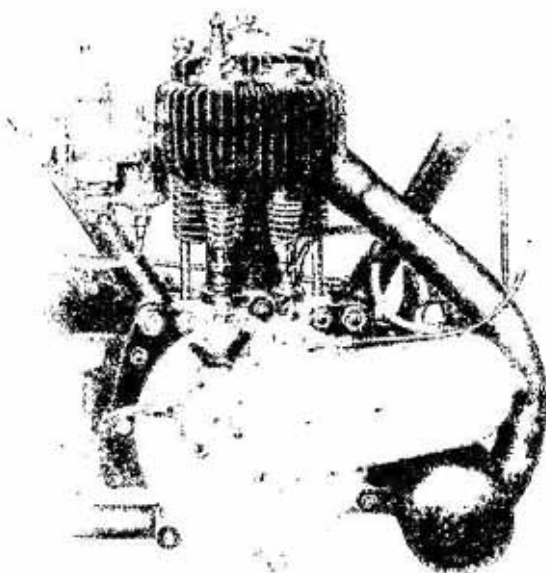
Engine.

Lubrication.—

The most important point in connection with the engine is lubrication. Give about one pumpful every 10 miles, and rather more if fast riding is indulged in.

The type we employ gives a direct feed to the engine, oil being delivered as the plunger rod ascends on the up stroke. To give a charge of oil to the engine, depress the plunger to its full extent. This will fill the barrel with oil, and the plunger being spring loaded it will automatically ascend, and in so doing force the oil into the engine, the plunger rising during the process until it is in position for the next charge to be delivered.

To cut off the oil supply at any moment, such as when the machine is left standing, the tap should be turned off, that is, should be at right angles to the pipe. As a further precautionary measure the lubricator can be put out of action by pressing down the plunger to its full extent, and fixing it in this position by means of the small catch provided.



A.J.S. 2 1/2 H.P. ENGINE.

Illustration C.

position by means of the small catch provided.

Riders and riding conditions vary, so it is absolutely necessary to leave the question of lubrication to each individual's judgment to a certain extent.

The engine working harshly, and a falling off of power, are the usual symptoms of under lubrication. Over lubrication is shown by oil un duly working out of the valve tappets and smoke issuing from the silencer. Over oiling will sometimes cause the exhaust valves to stick or move sluggishly in their guides. The symptoms are mostly apparent when the engine is cold. Mis-firing occurs, also explosions in silencer and difficulty of starting. The remedy is to take out the valves and clean the stems and guides with petrol.

Adjustments and Cleaning. See that the valve tappets are always properly adjusted. The thickness of a visiting card is about the correct clearance between the tappet top and valve stem when the valve is on its seat. Check the clearance when the engine is hot, not when cold. Use two spanners to unlock the adjusting nuts.

To remove the cylinder for cleaning first disconnect the inlet pipe, exhaust pipe, sparking plug. Next unscrew the holding down nuts and remove the bridge. This now leaves the cylinder head free for removal. With a screwdriver or similar tool inserted between the top cylinder flange and the head, prise the head carefully off the cylinder on both sides, taking care not to break the radiating fins. Prise upwards not downwards. When the heads are removed it is an easy matter to draw the cylinder off the piston. In doing this the engine should be turned over until the piston is at its lowest position, and draw off the cylinder carefully, taking care that when the piston is free not to let it fall sharply against the connecting rod, as this may crack or break the skirt of the piston, which is easily done. Having

ENGINE—continued.

removed the cylinder, wrap a clean cloth or rag round underneath the piston to prevent any foreign matter or dirt getting into the crankcase. If the combustion head is badly carbonised this must be cleaned. The generally accepted method being to scrape the chamber free of the burnt charges, which can be done with an old screw-driver or similar tool. The top of the piston should also be scraped free of all deposit, using an old blunt knife or chisel, and while carrying out this operation see that no side strain is thrown on the piston. If the rings are quite free in their grooves they need not be removed, but if they are obviously choked up with burnt oil loosen them very carefully, take them off the piston and clean the grooves thoroughly. Having got rid of all deposit from both the head and piston, wash all particles off with paraffin. Before replacing the cylinder after cleaning, carefully oil the piston, and see that the joints of the piston rings are on opposite sides of the piston. Take care when replacing the cylinder on to the crankcase to see that the packing washer is inserted between the top of crankcase and the base of cylinder.

If it is required to remove the valves at any time for inspection, grinding in, etc., there is no need to touch the cylinder. All that has to be done is to unscrew and take out the valve cap, then place the hooked end of the special valve extractor, which is provided in every tool kit, on the top of the valve, using the valve cap spanner, which fits at the bottom of the hook, for the necessary leverage to lift the valve spring to allow the latter to be withdrawn.

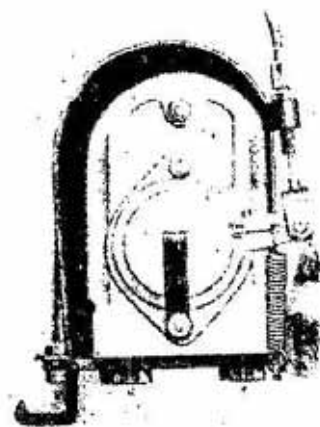
The valve can then be pushed up and drawn out of the head, via the valve cap aperture. If the valve seatings are at all pitted grind in the valves with fine emery flour, taking care that all emery is cleared out of the valve-chamber after the operation. The valves should, generally speaking, be ground in about every 1,500 miles.

Drain old waste oil out of the crankcase of engine about every 1,500 miles. For this purpose a drain plug is fitted on chain case side of crankcase. See that fresh oil is pumped into engine again, after draining out the old oil.

Examine periodically the bolts which holds the engine in frame, and tighten any nuts that may have worked loose. Keep the engine clean externally, which can be done quickly and easily with a painter's brush and a tin of paraffin.

Magneto Adjustment.

Examine the driving chain occasionally, and, if slack, tighten it by moving the platform in a forward direction. Slackening off the four pins underneath the platform allows this. When the correct tension has been obtained, screw the pins up again tightly. Examine also the nuts securing the chain sprockets to the engine shaft and armature shaft of magneto respectively. After examination, before replacing the cover, oil the chain.



ADJUSTMENT PLATE

2 1/2 A.J.S. MAGNETO ADJUSTMENT.

Illustration D.

Gear Box.

Lubrication.

The gear box needs no attention whatever with the exception of replenishing with oil every 500 to 800 miles. Oil as used for the engine is suitable, but a very thick oil is the most suitable. It will facilitate the entry of oil into the box if the back wheel is slowly revolved (with gear in neutral position) while pouring in the oil.

To dismantle the box the following procedure must be carried out:—

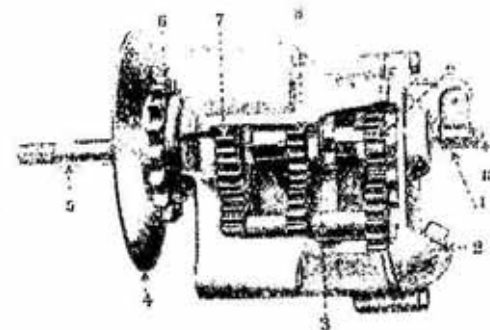
First unscrew the set pin which holds the long lever on to the hexagon ended arm of the operating shaft. The clutch lever can then be knocked off the arm, and the operating shaft, which is now free, can be swung over out of the way or removed entirely by pulling it out of its housing. The short push rod can then be taken out, and the thrust lock nut unscrewed from the end of the main shaft.

This has a left-hand thread, and the punch provided in the tool kit should be employed to unscrew it, using the large spanner as a hammer. Behind this will be seen the thrust washer. To take this out push the main shaft back a little, so as to allow the washer to be withdrawn. This washer fits on to a dowel peg, and care should be taken when replacing to ascertain that this is correctly in place. Now take out all bolts round the cover of the box and pull the cover off. The low gear dog wheel and lay shaft can then be taken out, also the sliding sleeve. The main shaft, complete with clutch, etc., can be drawn out from the opposite side of the box. To reassemble simply reverse these operations.

N.B. Be sure the Thrust Lock Nut is tight after replacing.

Do not forget to put fresh oil in the box after dismantling.

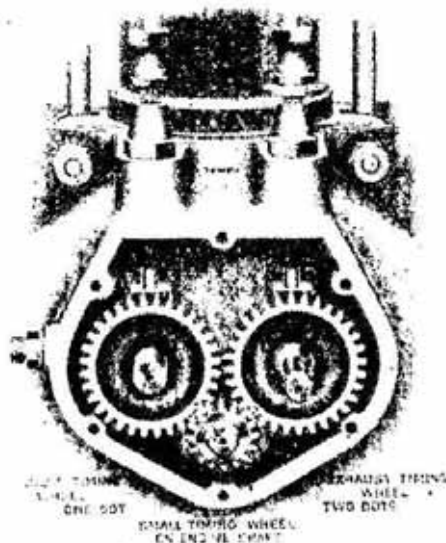
- 1 Clutch Operating Shaft for disengaging Clutch.
- 2 Oil Filler.
- 3 Lay Shaft or Secondary Shaft.
- 4 Fixed Clutch Plate.
- 5 Main, or Primary Shaft.
- 6 Sprocket for transmitting power to Road Wheel.
- 7 High Gear Dog Wheel.
- 8 Sliding Sleeve.
- 9 Low Gear Dog Wheel.
- 10 Bell Crank Adjusting Screw.



A.J.S. 3 SPEED GEAR (PORTION OF CASE CUT AWAY)

Illustration G.

Engine Timing. Except in case of necessity we do not advise tampering with the valve timing arrangement. However, if the engine has been completely dismantled for any reason, we make it a practice to so mark the timing pinions that replacement is a matter of perfect ease if the following instructions are carried out. To facilitate correct setting and meshing of the pinions these are marked with a dot system of identification as shown in Illustration E. On the small timing pinion will be found a single dot and a double dot. These dots correspond to similar marks on the inlet and exhaust valve timing pinions. To set the inlet valve place the single dot found stamped thereon, in register with the single dot on the small pinion, and similarly in the case of the exhaust wheel which has two dots stamped on it.



ARRANGEMENT OF TIMING GEAR
2 1/2 H.P. A.J.S.
Illustration E.

Magneto Timing.—The spark is timed to take place 95 m.m. or 2-in. on Model B before the top of the compression stroke, with the magneto control lever in the fully advanced position, and 127 m.m. or 3-in. on Models B1 and B2.

With the exception of carrying out the above instructions, do not tinker with the engine, nor fancy you can do better than the makers by tampering with the valve timing gear.

Clutch.

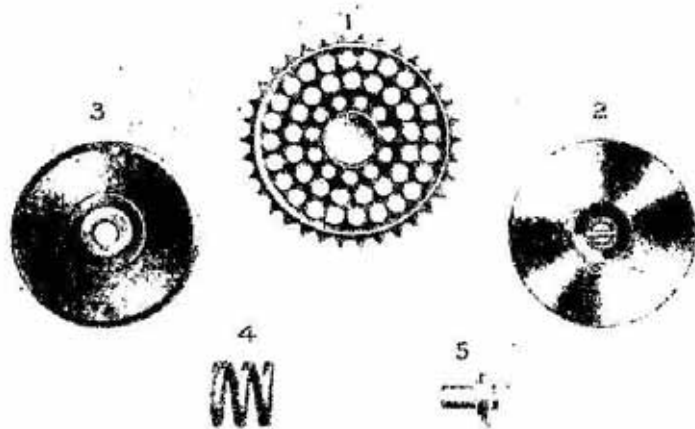


Illustration H.

- | | |
|---|---------------------------------|
| 1. Clutch Sprocket fitted with Cork Insets. | 3. Fixed Plate. |
| 2. Sliding Plate (note key in centre which passes through main Gear Box Shaft). | 4. Clutch Spring. |
| | 5. Clutch Spring Adjusting Nut. |

The Clutch parts are assembled in the following order: 3, 1, 2, 4 and 5.

Adjustment.

If the clutch should slip when climbing steep hills, tighten up the clutch spring a little by means of the adjusting nut on end of the clutch shaft. Do not tighten up the spring more than necessary to obtain a perfect grip, or unnecessary strain will be put upon the Bowden control, &c., when the clutch is disengaged.

Do not put Oil into the Clutch under any circumstances.

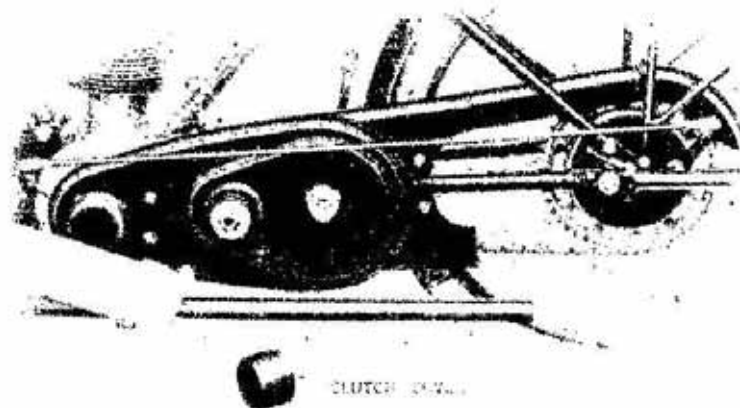
To take up excessive backlash in Bowden lever on handle bar adjust by means of the operating shaft adjusting screw No. 19 (Illustration G). A further adjustment is also provided by a stop formed by an extension of the rear engine plate (left-hand side) through which the Bowden cable passes. However, *always allow a little backlash in the lever, or the clutch spring cannot exert all its pressure on the plates.* If the clutch slips without any external reason, take it apart and ascertain if any portion of its mechanism is fouling another, and so keeping the plates apart. If the key in boss of clutch plate No. 2 (Illustration H) should foul the end of slot in shaft it would prevent the clutch engaging.

TO DISMANTLE THE CLUTCH, take off the front portion of the chain cover.

Unscrew the clutch spring adjusting nut No. 5 (Illustration H) and remove the spring No. 4. Take out the cotter pin of kick-starter crank and remove crank. This will allow the starting quadrant with its spindle to be drawn out until it can pass the stop on chain stay. The quadrant can then be swung clear of the clutch and allow the plates to be drawn off the clutch shaft. Before replacing, wipe the clutch plates clean, and smear a thin film of oil on the portion of shaft on which the front clutch plate slides. Also before replacing, examine the lock nut which holds the fixed plate in position. If loose see that it is carefully tightened up again.

CLUTCH.--continued.

It is, of course, necessary to take the chain off the clutch sprocket before this can be removed (see Illustration I, for particulars of chain joint). It will be found that a flat key passes through a slot in the end of the clutch shaft, and fits in the boss of front or sliding plate. Great care must be taken to see that this key is in its proper position or the clutch cannot be disengaged. This key is clearly shown in Fig. 2 (Illustration H) across the centre of the plate. To fit this key when re-assembling the clutch, turn the shaft till the slot is perfectly horizontal. Then put key in slot with each end projecting equally on each side of the shaft. The sliding plate should then be slipped on shaft with its keyway in a corresponding horizontal position.



CHAIN GUARD, WITH CLUTCH COVER REMOVED.

Illustration I

If to disengage the clutch becomes difficult smear a little oil on that portion of shaft on which the outer plate slides.

If the clutch should "drag," even when fully disengaged, it will make gear-changing very difficult, especially when changing down, for the reason that the drive is never properly taken off the gears, thus making it difficult to move the gear lever. This difficulty can be temporarily overcome by suddenly closing the throttle before changing down, immediately opening the throttle again after the change is made. The closing of the throttle takes the drive off the rears, and so allows easy disengagement.

To those riders who prefer a light adjustment of the clutch, the following hint will be useful. A clutch that is lightly adjusted will sometimes slip for a time after changing gear, but the slip will cease if the throttle is momentarily closed when the slip takes place. This is explained by the fact that for the moment the drive is taken off the clutch and allows the plates to settle down to their work.

Transmission.

Adjustment of Chains. To adjust the chain from engine to gear box it is only necessary to slack off the two nuts on top of bracket and slide the box bodily backwards by means of the adjusting bolt, situated at rear of bottom bracket.

It is important that the nuts are screwed tightly again after adjustment.

Back Chain.—Slack off the nuts on each side of back hub spindle, and move the wheel backwards by means of the adjusting screws in fork-ends. Care must be taken to adjust each side equally or the wheel will be out of alignment. Screw the spindle nuts up tightly again after the chain is properly adjusted. It may be found that moving the wheel back has caused the brake to be "on." This is easily rectified by means of the brake adjustment.

If the chain is too slack it is apt to "whip," which intensifies the wear and tends to break the rollers, especially in the case of the front chain. If on the other hand it is too tight, a crushing effect is produced on the rollers, and the whole chain is strained unduly.

The chains should be adjusted, and kept adjusted, so that they can be pressed down in the centre with the finger from $\frac{1}{2}$ in. on the front chain, and about $\frac{3}{4}$ in. on the back chain.



Care of Chains.

Lubrication. As the chains of the 2 $\frac{1}{2}$ A.L.S. are only partly enclosed it is a good plan to make a point of oiling the chains every day before starting out. One oiling will suffice for a day's riding whatever mileage is done. An oil gun is the best means of oiling the chains. With this instrument draw a charge of oil from the oil compartment of tank, and insert spout of oiler into the chain case oil plug hole, which will be found on top of front of chain case above the front chain. Lift the exhaust valves, and while pressing down plunger of oil gun, slowly turn the engine round with the foot starter, taking care that the oil from the oil gun is falling on the chain. This ensures the whole chain being well lubricated. Treat the back chain in the same way by slowly revolving the back wheel.

Long life, less need of adjustment, and complete satisfaction with the transmission is assured if the rider will make a point of oiling his chain frequently, to say nothing of the knowledge that they are regularly having a supply of fresh *clean* oil. A front chain should last from 7,000 to 10,000 miles, and the back chain 10,000 to 15,000 miles.

Chain Repairs.

A Chain hardly ever breaks if properly adjusted we have never yet heard of a chain breaking with our system of transmission, since it is usually worn out long before the breaking point is arrived at.

If lubrication or adjustment is neglected, broken rollers may occasionally be found. The chain can, however, be easily repaired with the Renold Stud Extractor (Illustration K1 and K2) and a few spare parts. This tool provides a simple means of removing the rivets, which cannot be filed down, as they are case-hardened. It can also be used for putting in a new outer link.

This tool provides a simple means of removing outer links by pushing the rivet heads through the plate.

The illustrations show clearly the method used in the removal of the outer link by means of this tool. As will be seen from Illustration K1 the two prongs of the supporting fork are placed in the spaces between alternate rollers so that the centre roller and rivet rest between the prongs.

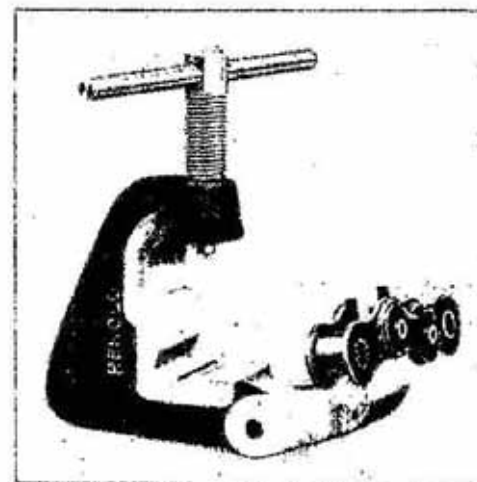


Illustration K1.

The fork is then swung up to the body of the extractor until the ends of the prong rest firmly on the supporting ledge which is provided for this purpose. The chain is now supported at both sides of the rivet it is desired to remove.

By means of a small amount of pressure on the handle of the screw it is a very simple matter to force the rivets through the upper outer plate. Do not use unnecessary force. A firm hand pressure on the handle of the screw is all that is required.

This process is repeated on the other rivet of the same outer plate when the lower plate of the outside link together with its two rivets will fall clear.

The fork is then swung back and the loose end withdrawn, and the necessary repair parts inserted.

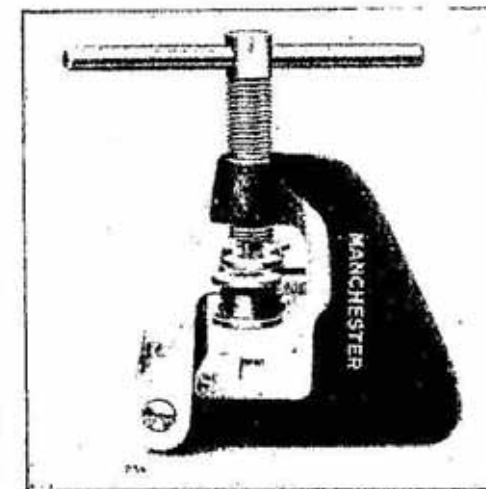
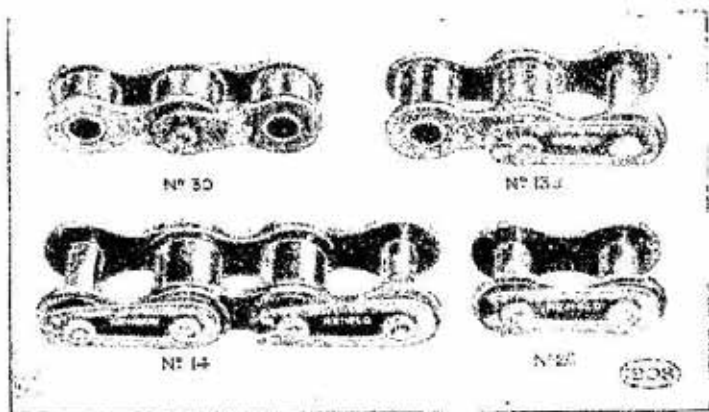


Illustration K2



CHAIN REPAIR PARTS.

Illustration 1.

The above illustration contains all the parts necessary to effect repairs to a chain:

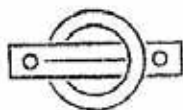
To shorten a chain containing an even number of pitches, replace by parts No. 20 and 25.

To shorten a chain containing an odd number of pitches, replace by parts No. 13.

To repair a chain with a broken roller or faulty inside link, replace by parts No. 14.

For joining up any length of chain where extremities are inside links, use part No. 25.

When a chain is joined up with a spring clip, it is most important that the clip is correctly fitted over the cover plate. The open end should always face in the opposite direction to which the chain travels.



Chain Guard.

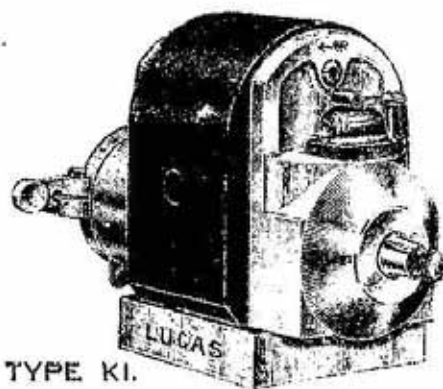
To remove the case completely, first disconnect the rod from the foot pedal by undoing the yoke end pin. This allows the rod to be swung back out of the way. Next remove the two bolts found on the forward end of the guard, then the rear bolts on chain stay clip and the anchorage to carrier stay. The rear portion of the guard can be removed independently of the front by means of the carrier stay anchorage previously referred to.

These directions will be suitable for the B1 and B2 Models. It will be found unnecessary, however, to remove brake rod.

Magneto.

Lubrication.

The magneto requires only the least possible amount of lubrication. It is fitted with ball bearings, and a few drops of oil at each of the places provided once or twice a month when in regular use is all that is required.



TYPE K.L.

LUCAS MAGNETO.

TYPE K.L.

Illustration M.

Adjustment

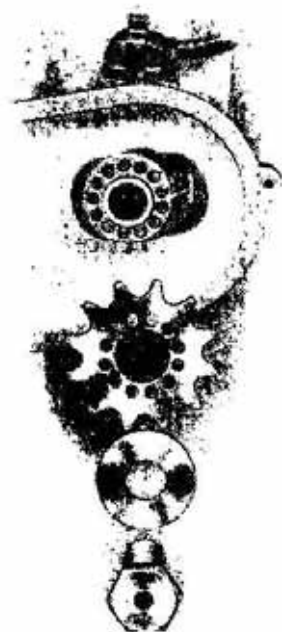
The platinum contacts should be examined after about 1,000 miles, and if the break should be more than the thickness of a visiting card they should be adjusted. The proper distance of the gap is $0\frac{1}{2}$ in. or roughly $\frac{1}{16}$ in. full. Too great a gap will advance the timing. A special small spanner is provided with each machine, and the gauge of this is the correct distance for the break of the points. This adjustment, owing to the arrangement of the contact breaker, can be carried out without removing the contact breaker from the magneto. If it is necessary to take the contact breaker out, unscrew the long taper fixing screw, and pull the contact breaker off. The points only

need attention at very long intervals, and we warn users against unnecessarily interfering with the setting. *The platinum points must only be dressed with a drill smooth file if the surface has become at all pitted, and then the least possible amount taken off.* The greatest care must be exercised, as platinum is a very expensive metal.

Timing

If the magneto has been removed from the machine it will be necessary to see that it is timed correctly after it is refitted. The engine magneto driving sprocket is secured to its shaft by means of castellations, which render wrong replacement impossible. The sprocket on the armature shaft of the magneto is supplied with a vernier timing adjustment, which allows a very accurate and certain method of fixing the drive after the correct setting has been arrived at. The setting of this vernier adjustment may at first sound a trifle complicated, but in reality it is perfectly simple. Keyed to the armature shaft of the magneto is a sleeve (A), which has thirteen holes ranged in a circle. Fitting over a collar on this sleeve is the chain sprocket (B), which has twelve holes similarly arranged. Now on the sprocket on engine driving shaft and on the magneto shaft an arrow will be found. *These must point to each other before anything else is done.* The first thing then in timing up is to set these two arrows so that they face exactly towards each other. To do this turn engine over until the arrow on the driving sprocket is pointing directly towards the arrow on the magneto sprocket. This latter should be held free in the fingers and moved a tooth backwards or forwards in the chain until the correct setting is arrived at. When this is so, place the magneto sprocket on to the sleeve, and turn the armature shaft of magneto until a mark found punched over one of the twelve holes on the sprocket exactly registers with a similar mark on the outside of the collar of the sleeve. It will now be found that the marked holes in sleeve and sprocket respectively exactly coincide, so that all that has to be done is to

push the peg washer 3 into these holes, which effectively prevents the sprocket from moving from its correct setting and tightly screw up the sleeve lock 4, which can be done without fear of the timing shifting in the process, as is often the case with other methods. Set the piston 2 in. from top of compression stroke make sure it is not on the exhaust stroke. With the engine in this position take off the sleeve lock and on magneto sprocket and remove the peg washer. This will leave the armature free from the engine drive, but still connected via the chain to the engine. See that the sprockets have their arrows facing as previously mentioned. Move the ignition control lever to the limit of its motion of advance. Remove the cover of contact breaker and slowly turn the armature till the fibre block of the make and break lever rests on the inclined plane of the steel segment just sufficient to separate the platinum points. This is the firing point, and in this position the markings previously referred to on the sleeve and sprocket should register if correctly fitted up. If so, the drive should be fixed up as before detailed. It is, however, always advisable to check the timing after tightening up.



MAGNETO TIMING- VERNIER
ADJUSTMENT.

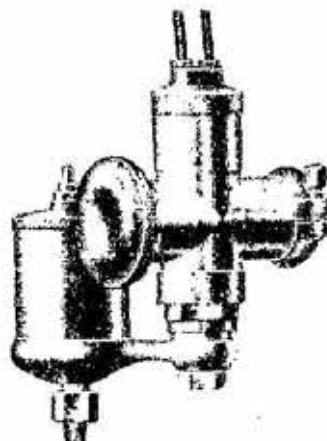
Illustration N.

It will prevent mis-firing, and make starting easier, if the slip ring is cleaned occasionally. This is done by taking out the high tension terminal and while the magneto is being revolved by slowly turning the engine round, insert a lead pencil the end of which is covered with a clean rag moistened with petrol. The pencil should be pressed on the revolving slip ring.

When Ignition Trouble is suspected—Before interfering with the magneto verify that the sparking plug, the cable, and the connections are correct. If these are in order, turn the engine slowly by hand and watch if the contact breaker lever works properly. This is bedded in a fibre insulating bush, and in moist weather there is an occasional danger of the material swelling. If this happens, ease it out very slightly. This is a most common fault with all magnetos, and should be watched particularly by motor cyclists in winter. Do not take the magneto to pieces needlessly. It is easily possible to damage it.

Most Important—If it is necessary to take out the armature first see that the carbon collectors and safety gap screws are removed, or the collector ring will be broken during removal. Keep all parts clean and free from oil, particularly the contact breaker. Oil or dirt between the points will give instant trouble.

Carburetter A.M.A.C.



A.M.A.C. CARBURETTER.

Illustration O.

Slow Running—Either a too rich or too poor mixture will cause mis-firing at slow speeds. If the mixture is too rich, black smoke will issue from the engine. If too poor "popping back" will take place in carburetter.

The following will prevent slow running:

Too large a jet or carburetter flooding. Unequal wear of inlet valve guides. Fuel petrol supply. Dirt or water in petrol. Weak exhaust valve spring. Faulty plug or points or plug too close. Have the points of plug as wide as possible consistent with easy starting. Plugs properly adjusted make a considerable difference to the running of the engine at all speeds. Slight leakage of high tension current to frame via high tension cable. Weak magnets. Dirty and badly worn contact breaker points, or too great a gap between the points & lead breaker.

Setting and Driving—The jet should not be so large that the engine will take full air with the throttle well open. The air slide act as a variable choke tube, and the air pipe between carburetter and inlet pipe should be smaller than the inlet pipe.

The air filter should open freely and not be closed when coming full out. If more the jet is too large, the jet is too small.

It will be found that too advanced a mixture in petrol is not necessary to alter the position of the air slide, as can be done by the use of a variable choke tube to a certain extent. Once they fall the carburetter should be closed somewhat, and also for very low running will open it all the way, and the machine will run with the throttle well open and the air slide well open owing to the

CARBURETTER. - continued.

supplementary action of the slides. This is not an indication that the jet is too large or that not enough air can be given, but is a natural consequence of its semi-automatic action. When the carburetter is properly set the air lever should have three positions:

For high speeds and hard driving. HALF CLOSED.

Slow speeds in traffic. NEARLY CLOSED.

Ordinary speeds. FULL OPEN.

Easy Starting - To start the engine easily do not open the throttle more than half way. The following can prevent easy starting:

Badly worn inlet valve guide. Petrol pipe stopped up with dirt, &c. Air lock in petrol pipe or tank. Mixture too poor owing to too small a jet. Throttle too far open. Carburetter not vertical. Faulty ignition. Ignition retarded (see "Slow Running.")

If the engine is very difficult to turn over when cold, inject petrol through the compression tap.

Adjustment of Slides - Put the control levers in closed position, then screw the adjusters on top of throttle barrel in or out until all slack is just taken up. When doing this, hold the cable to prevent it twisting with the adjuster. All sharp bends must be avoided or the inner cable will work stiffly.

It is extremely important that the inlet pipe joints be absolutely air-tight to get satisfactory slow running.

Flooding - This can be caused by any of the following reasons:

Dirt on needle valve seating. Gauze in filter preventing proper working of needle valve. Bent needle valve. Split pin not being fixed under collar on needle valve. Punctured float. Carburetter not vertical. Needle valve too long and fouling the underside of float-clip.

In most cases flooding is caused (especially on new machines) by dirt on the needle valve seating. This can be cured by twisting needle valve with the fingers while pulling upwards.

Do not leave the machine standing for long periods without turning off the petrol.

Petrol Consumption - To get the best results study carefully the hints given under the heading "Setting and Driving."

Other causes of heavy petrol consumption not due to carburation are:

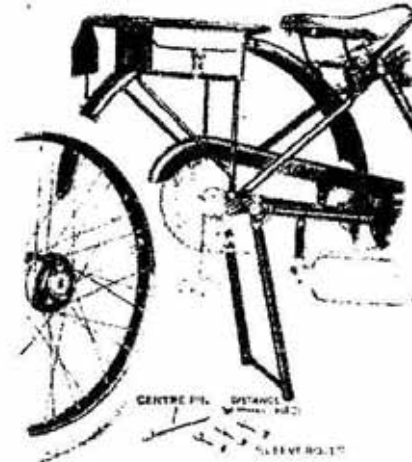
Allowing the engine to run for long periods when the machine is standing. Unnecessarily using the free engine clutch, and driving on the low gears without a cause. Driving with ignition retarded. Inlet valve spring too weak causing "blow back." Air gauze stopped up with dust or mud (this will cause misfiring). Lift of exhaust valve too small. Choked silencer.

Important Note - After a new machine has been run about 200 or 300 miles, and the engine thoroughly "run in," a smaller jet can usually be fitted to advantage, especially regarding petrol consumption.

Try a No. 28, 27, or even No. 26 jet before being satisfied that the best results are being obtained, consistent with satisfactory running.

Between the air intake and the body of carburetter is fitted a disc of gauze which prevents dust or foreign matter getting in the engine. Periodically cleanse this gauze. If the gauze is choked with dust, etc., no air can get to the carburetter, and erratic running takes place, the cause of which is difficult to trace.

Detachable Wheels.



Back Wheel - To remove the back wheel proceed as follows: Put the machine on the stand and with the box spanner provided first unscrew the three sleeve nuts which pass through the hub flanges. To prevent the wheel revolving while unscrewing the sleeve nuts, place the foot against the tyre at bottom of wheel. The three sleeve nuts extend right through the wheel and rear hub flange, and screw on to the three threaded studs on the driving sprocket. There are also three plain studs on the sprocket which act as dummy drivers. These fit into the three remaining holes in the hub flange. After the sleeve nuts have been unscrewed then unscrew the centre pin and draw it completely out, together with distance piece. The space now left by the distance piece will allow the wheel to be drawn off the driving studs in sprocket. The whole operation should not take more than 30 to 40 seconds.

To replace the wheel, push it squarely on to the driving studs and *and* (with the distance piece in position) screw up the centre pin moderately tight. The three sleeve nuts can now be screwed up *tightly*, afterwards giving a final turn to the centre pin. It is very important to point out that when the centre pin is removed, the wheel is hanging on one fork only, so any rough treatment must be carefully avoided or there is great danger of straining or breaking the fork end. *Under no circumstances must the centre pin be removed until the machine is jacked up on the stand, and the centre pin must always be in position before the machine is taken off the stand again.* If for any reason the wheel should be difficult to pull off the driving studs, screw in the centre pin a few turns (without the distance piece), this will steady the wheel while drawing it off the driving studs.

If the rider wishes to fit a new tube without removing the wheel entire, he must first take off the one side of the tyre and remove the tube in the ordinary way. Next take out the centre pin and distance piece only, leaving the sleeve nuts intact. This will be found to give sufficient space between the hub and the fork end to allow the tube to be passed through and drawn completely out. Now replace the distance piece and the centre pin and proceed to refit tube and cover. Fitting the centre pin first hold the wheel steady while the tyre is being manipulated.

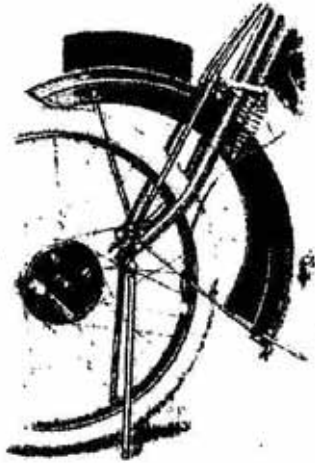
Periodically test the centre pin and lock nut with the spanner, and keep them tight. If the lock nut has a small hammering will be felt when driving at slow speeds. If this is noticed tighten the lock nut at once. When the back wheel is removed, the wheel anchor is disconnected from the chain sprocket, brake, chain case, etc., remaining in their normal position. If desired the wheel complete with sprocket, brake, etc., can be taken out a back quite a simple operation. Remove the back portion of chain case and wheel off pinion nut and detach brake cable by removing the pinion nut. Take the chain off the sprocket by means of the spring link and on to the anchor pin which projects into slot of brake anchor plate, sufficient to clear. The wheel will then fall out of slots in fork-ends.

Method of Replacing Footstarter Spring.

DETACHABLE WHEELS. -continued.

When replacing the chain it will facilitate the fitting of spring link if the ends of the chain are encircling an equal portion of the sprocket. This also applies to removing the spring link.

When the wheel is replaced, see that the brake anchor pin is screwed into the slot in anchor plate and the spindle nuts are tight.



Removing Front Wheel—
First remove cable yoke from brake lever and unscrew cable adjuster clear of the stop. Next remove pin which penetrates the slot in anchor plate, and after slackening spindle nuts the wheel will then fall out of slots in fork ends.

The adjustment of the hub bearings is perfectly obvious. Both wheels are disc-adjusting. Don't let the hubs run loosely, but take care that they are not adjusted too tightly.

This is a common cause of broken balls and cracked ball races. When properly adjusted, the weight of tyre valve should revolve the wheel. If placed above the centre of wheel. At the same time the wheel should have no shake.

This brake requires no attention except occasional adjustment at either end of the rod.

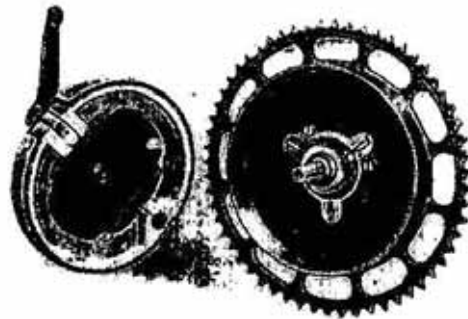
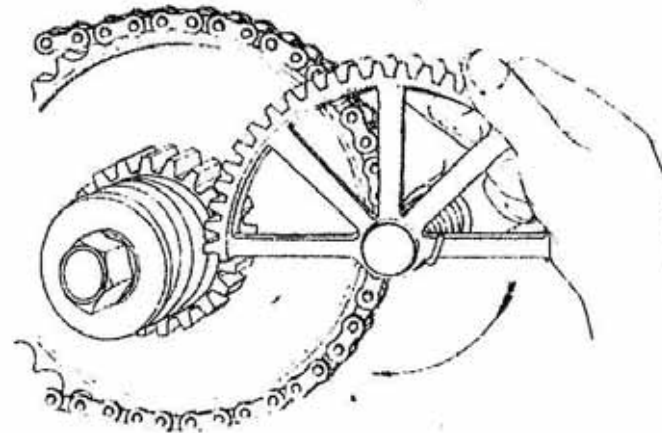
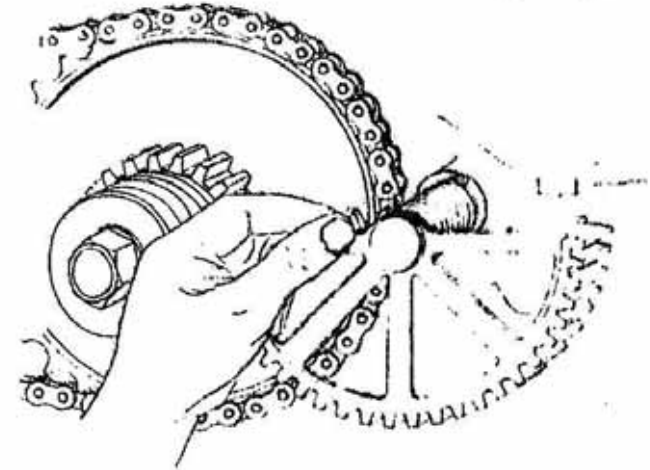


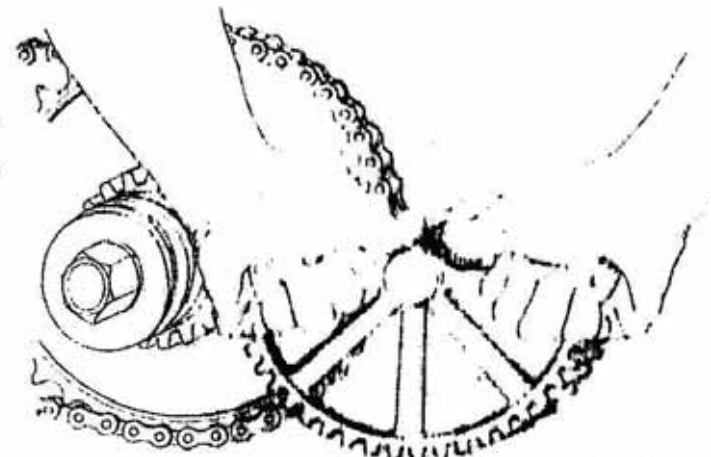
Illustration R.

1. Hook free end of Spring over Top Spoke of Footstarter Quadrant.

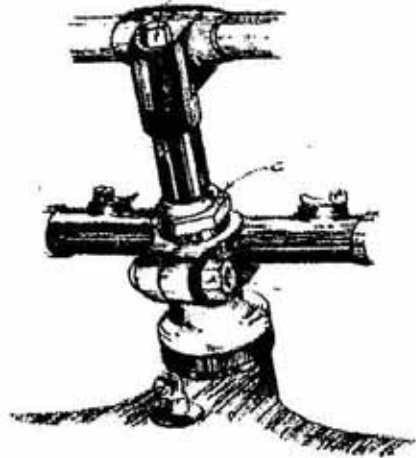


2. Turn Quadrant a complete Revolution in Direction of Arrow.

3. Push Quadrant into position, at the same time pressing with both thumbs the outer coils of the Spring down and over Footstarter Shift Tube.



Steering Head. (Adjustment.)



LATE 1920, 1921 & 1922 MODELS.

1. Unscrew Bolt A four turns and give it a sharp tap with hammer.
2. Slacken Nut B.
3. Adjust steering head by Nut C.
4. Lock up Nut B and Bolt A.

General.

Remember you have a bicycle as well as a power plant. Frequently oil the links of spring fork. Periodically put oil in the hubs or fill with vaseline. Oil occasionally any little moving parts about the machine, such as brake shackles, Bowden levers, joints of control rods, change speed lever, gear box clutch lever, etc. An oil gun is a most useful accessory. A charge of oil can be drawn out of the oil tank and used for lubricating every part of the machine.

Keep the machine clean. If mud, etc., is allowed to accumulate, it will work into bearings, especially the hubs, and cause undue wear. Do not wash the machine down with a hose-pipe. By so doing it is easy to get water in the petrol tank or carburetter, and cause trouble. Remove mud by means of a sponge and a bucket of water.

Pack tools tightly in the tool case with cleaning cloths, and so prevent them rattling about. Treat spare parts the same. The pannier bags can be used for carrying spare tubes if they are carefully and tightly packed, but it means certain destruction if they are not.

Keep the back tyre fully inflated, but not board hard, and see that security bolts are tight. It is not necessary to have the front tyre inflated as hard as the back.

Do not fit all-steel studded tyres. They are positively dangerous on granite sets or tramlines, especially if wet.

It is not necessary to carry a load of spare parts with the machine. The only parts that may be required under ordinary conditions are:—

One spare valve complete with spring, washer and cotter, a good substantial tyre repair outfit, one each spring link and half link for chains, two good sparking plugs, an inside plaster for tyre in case of a bad cut or burst, and a good supply of observant common-sense.

For very long journeys or an extended tour it is wise to carry (in addition to the above) a spare front chain complete with spring link.

Any further information required we shall only be too happy to give if communicated with direct, but it will save unnecessary correspondence if our patrons will ascertain first, that the information is not already given in this booklet.

“Safety First” Hints.

Never drive faster than you can pull up in the distance you can see.

Never attempt to overtake another vehicle on a blind corner.

Always keep close to your right side of the road when taking a blind corner.

If the machine will not comfortably climb a hill on high gear it is no disgrace to change down, and besides it is faster to do so.